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densation for the purpose of a review. It is to be warmly commended to all students of comparative educational methods, and will be found fruitful in suggestions. It closes with this significant sentence, which, while applied by the author to England alone, is capable of extension to the United States: "In the zigzag and indirect way in which progress is made in my own country, we are, I believe, approaching to a condition in which the State will exert more and more influence and control over secondary and higher education, and I am inclined to think that the change will be to the advantage of our schools, and, on the whole, a gain to our teachers."

Outlines of Practical Physiology. By WILLIAM STIRLING, M.D. Philadelphia, Blakiston. 12°. \$2.25.

THIS work was written to supply the wants of the students at Owens College, Manchester, in which institution Professor Stirling occupies the chairs of physiology and histology. The experiments described are those which are performed by every member of the medical class, and are such as to illustrate all the important facts connected with human physiology. The book is a most practical one, the author having constantly borne in mind that "the student of to-day becomes the practitioner of to-morrow." The illustrations are numerous, well selected, and admirably executed. Taken as a whole, the 'Outlines' will be found to meet the wants of all teachers of practical physiology, not only in medical colleges, but in other institutions where such instruction forms a part of the curriculum.

Manual of Pharmacy and Pharmaceutical Chemistry. By CHARLES F. HEEBNER, Ph.G. New York, The Author, 5 Gold St. 12°. \$2.

THIS manual has been prepared by the author to be used as a class-book or note-book by the students at the various colleges of pharmacy. It is not intended to take the place of lectures in pharmacy, nor to replace the many exhaustive works on this subject, but rather as a book to be used by those who have already gone over the ground, whether students or pharmacists, and who desire, either as a preparation for examination or for other reasons, to review the whole subject in a condensed form. For this purpose it seems to be well adapted, though its usefulness would be enhanced were it provided with an index in addition to the table of contents.

NOTES AND NEWS.

THE prompt and favorable report of the judiciary committee of the National House of Representatives on the international copyright bill has greatly encouraged the friends of that measure. The passage of the bill by the Senate during the present session of Congress has not been in much doubt, although the consideration of it has been postponed from time to time on account of the urgency of other business. But the House of Representatives, it was feared, would hardly find time to deal with the subject. It may not now, but the unanimity of the committee, and the earnestness of some of the most influential Democratic members, in their advocacy of it, have greatly encouraged the friends of the measure. The bill may not become a law this year, but there is every reason to hope that the present Congress will not expire without its being placed upon the statute-book.

—The third field-meeting of the Indiana Academy of Sciences will take place at Wyandotte Cave, Crawford County, Ind., on Thursday, May 3, 1888.

—A few wild animals recently placed on exhibition near the National Museum in Washington form the nucleus of a zoological collection that may rank, as the museum does, among the most important in the country. Recognizing the importance of preserving at the national capital living specimens of the native fauna of this country, Mr. Beck introduced in the Senate, on Monday, a bill to establish a zoological park in Washington. The bill creates a commission, which is directed to secure one hundred acres of land bordering on Rock Creek, about one mile from the city, to prepare the grounds and erect suitable buildings upon it. The park is then to be turned over to the regents of the Smithsonian Institution

for their future custody and care. The site indicated is one of the most beautiful in the District of Columbia. It is composed of rolling ground, with the beautiful Rock Creek flowing through it, and it is adjacent to Woodley Park, one of the most charming of the recent additions to Washington. A street-railway is already projected to it.

—Thomas Hampson, proof-reader and editor of publications of the Geological Survey in Washington, an active member of the Cosmos Club and Anthropological Society, and the working editor of the *Anthropologist*, a new magazine recently established by the latter organization, died on Monday morning, after a short illness. Mr. Hampson was a man of great experience and rare accomplishments, especially as a philologist, linguist, and grammarian. As a careful editor, he had few equals. He distinguished himself years ago in the Bureau of Education, and has fully met Major Powell's expectations since he secured his services for the National Survey.

—A Sydney (Australia) newspaper reports that in March the steamer 'Titus,' when in the vicinity of Cape St. George, on the south-eastern coast of Australia, encountered two heavy seas which rolled on board, and, immediately after, the decks were found to be covered with a matter resembling red sand. The seas flooded the decks and chart-room, but did no serious damage. The seas were probably caused by a submarine earthquake, which stirred up the mud at the bottom of the ocean; but the phenomenon described is a very unusual one.

—In order to centralize in a single focus all the results of studies devoted to African languages, Rev. C. G. Büttner, inspector of East African missions in Berlin, has founded a *Zeitschrift für afrikanische Sprachen* (A. Asher & Co., publishers), of which the first quarterly number has been issued. It offers a series of interesting documents, of myths, popular songs, and vocabularies; and the following may give an idea of the contents, most of which are laid down in the Lepsius missionary alphabet. *Chuo cha utenzi* is a long poem in an ancient Suahili dialect. The late Dr. L. Krapf, who transmitted it to the German Oriental Society in Halle, thought it was a translation from Arabian. It is written in the Arabian *talikh* script, and was transliterated by Krapf. The portion published in the first number holds 894 lines, but contains no translation. C. H. Richardson, a missionary among the Bakundu of the Cameroons, gives a short grammatical sketch of their language. J. G. Christaller, who formerly conducted missions on the Gold Coast, publishes myths concerning creation, origin of man, deity, cause of death, from different African nations, with interlinear translation, free translation, and linguistic notes. From Rev. Endemann we get song-texts of the Sotho people of a very curious description, and not comprehensible without the comments subjoined. Then follow small word-lists of two languages spoken near Kilima-Ndjaru Mountain and a specimen of H. Brincker's 'Dictionary of the Otjiherero and Objambo Languages,' now going through the press of T. O. Weigel, publisher in Leipzig. The first number contains only specialties, and of special knowledge all general knowledge and science are built up. This commencement augurs well for the future of the periodical, which is in scientific hands, and will encourage all the missionaries in that distant land to make their investigations public. The Germans and English are always busy in bringing the results of their scientific researches in linguistics before the public; while others, many Americans among them, are better known for their inclination to lock up useful material in their drawers and strong-boxes.

—Mr. L. D. Allen of New London, Conn., has deposited in the National Museum at Washington a number of Indian curiosities collected by his son, Mr. J. Isham Allen of Montana. Among them is a painted elk-skin once possessed by Pretty Eagle, a former chief of the Crows. It is covered with the figures of eight mounted warriors, and several on foot, all rudely drawn, but of bold and vigorous design. They tell of the victories of the chief over his enemies. There is also a war-bonnet, which is composed of the entire skin and down of a swan, and is ornamented with eagles' plumage and wampum. It was captured by a Crow chief from the North Assiniboin. Another article is a bow and arrow, the former property of a Crow chief, Bean-in-the-Water, and a medicine-horn

made of a buffalo-horn, and ornamented with a white weasel's skin.

— A bottle thrown overboard near Pernambuco, Brazil, July 28, 1885, to assist in tracing the direction of ocean-currents, was found at Little Cayman, W.I., March 1, 1888, about thirty-two hundred miles from the starting-point. A note made upon this report at the Hydrographic Office, Navy Department, Washington, says that the bottle probably drifted along the Spanish Main into the Gulf of Darien, thence due north across the Caribbean Sea, passing around Jamaica between it and San Domingo and Cuba, and thence about west by north to Little Cayman, passing over a distance of about four thousand miles. Taking the average of the current at two knots an hour, the voyage occupied less than two and one-half months; so that the bottle was probably on the beach at Little Cayman more than two years before it was discovered.

LETTERS TO THE EDITOR.

**.* Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

Twenty copies of the number containing his communication will be furnished free to any correspondent on request.

The editor will be glad to publish any queries consonant with the character of the journal.

Formation of the Explosive Chloride of Nitrogen by Electrolysis.

ON the 14th of this month I made the discovery that the chloride of nitrogen, a dangerously unstable compound, is formed during the electrolysis of a solution of ammonium chloride (sal-ammoniac). The difficulty and uncertainty of its formation by electrolytic analysis will be understood when it is remembered that nitrogen chloride is the resulting product only when numerous powerful chemical affinities are in equilibrium.

The operation may be successfully conducted as follows: a saturated solution of ammonium chloride (temperature 7° C.) contained in a suitable apparatus is electrolyzed between platinum electrodes, care being taken to shield the solution from direct sunlight. After the decomposition has proceeded for some time, — chlorine being evolved at the positive electrode in minute bubbles, which are absorbed by the solution, — small particles of a light-yellow liquid, with a most peculiar oily appearance, will be observed to collect on the surface. These soon combine to form small globules, which sink slowly to the bottom of the vessel. If a warm solution be electrolyzed in a brightly lighted room, no such results will be obtained; the nascent chlorine decomposing the solvent water to form hydrochloric acid.

As this substance is one of a class of compounds which explode violently by a rapid dissociation of their constituent elements, the following precautions are necessary to insure safety: 1st, the temperature of the solution must not be allowed to rise above 10° C.; 2d, the apparatus must be of the strongest construction, scrupulously clean, and not exposed to an intense light; 3d, if a powerful battery is used, it must be disconnected from the apparatus immediately upon the formation of the first drop of the explosive; and, 4th, it is prudent for the operator to protect himself by means of globes and a strong mask.

The chloride of nitrogen as thus prepared is a highly volatile, limpid, oily liquid, with an extremely pungent odor. It evaporates rapidly when exposed to the air, producing an unwholesome vapor. The stability of this substance seems to be in an inverse ratio to the rapidity of its formation, the maximum of safety being attained by the production of about four drops an hour. If the electro-motive force of the battery be but little in excess of that required for complete electrolysis, the explosive may be allowed to collect in the apparatus, where it will be gradually and harmlessly decomposed by the electric current.

This dangerous compound was first prepared in the year 1811, by Pierre Louis Dulong, an eminent French physicist, during a series of experiments on the chlorine compounds. Owing to the serious injuries he received on that occasion, Dulong thought it best to keep the discovery a secret, lest others should be tempted to repeat his perilous experiments. This precaution had, however,

an unfortunate result; as Sir Humphry Davy, a few years later having rediscovered the same compound, and being ignorant of its nature, was also injured by its violence.

In view of the fact that the salts of ammonia are present in the oxidizing liquids of so many electrical batteries in use at the present day, the subject has, I think, considerable practical importance. May not this dangerously explosive compound be formed, under certain circumstances, by the electrolytic actions necessary for the proper working of the battery? Perhaps some of the readers of *Science* will be able to furnish information on this point.

In the mean time I will continue these investigations to ascertain, if possible, the nature and quantity of the remaining products of the decomposition, the action of different solvents, and the results to be obtained by substituting other ammoniacal salts for ammonium chloride. I will also observe more closely the nature of the explosive, and its behavior when acted upon by high potential electric currents.

WILLIAM B. HALE.

Clinton, Ontario, Can., April 18.

Indian Graves.

ON the 17th of April some men were employed in scraping out a cellar on West Oneida Street in Baldwinsville, N.Y., and threw out several Indian skeletons. The scraper broke these badly, especially the skulls, but yet some interesting facts could be observed. I was able to get tolerable horizontal measurements of two skulls; the circumference of one being 20 $\frac{3}{8}$ inches, and of the other 19 $\frac{1}{2}$ inches. But for being broken, another was in very fine condition. It was that of a young person.

That this was a case of horizontal burial seemed probable, but was made certain the next day by the careful opening of another grave a few feet away. In this case the skeleton lay with its feet to the north, the knees being drawn up; the hands were brought up to the neck; and, while the head lay to the south, the face was turned to the west, the body having been placed on its side. In previous gradings and successive ploughings, the earth had been partly removed and the skull shattered. The soil was of fine gravel and sand, sloping to the south, and on the hill a little to the north had been an Indian village. No relics were found with the bodies, nor do they seem common in these horizontal burials here.

This was on the north side of Seneca River. In the autumn of 1886 I witnessed the opening of another burial-ground in the village on the south side. The size, condition, and position of the skeletons were much the same, and I was able to make several careful measurements. This was close by a level site of an early Indian village, affording much earthenware. The soil was a clear sand loam, unmixed with gravel; but under almost every skeleton was a small stone. There were no relics; and, though the skeletons lay on one side horizontally, there was some confusion, and apparently no attempt to face the west.

Four modes of Indian burial are known in Onondaga County, and possibly five. The oldest seems to have been the horizontal mode, not at full length, but with the limbs drawn up, and with no articles in the grave. In a single instance a kind of mound-burial has been found, where the bodies were laid horizontally, with some articles, and the earth heaped over them in a mound of considerable size. I was fortunate enough to get a picture of this before its removal. The third mode was that of the early Onondagas, who entered the county early in the seventeenth century. Before they came into central New York, they probably used ossuaries, like the Hurons, but there are no known instances around their later homes. When the French entered Onondaga, the local mode was to put the body in a sitting posture, placing some articles with it. Under European influence, this gradually changed, and the burial was much as with us, a century ago. In other places there have been other modes, as in the burial of several, one above another, in Cayuga County, and reported circular burials elsewhere. One curious grave has been brought to my attention by Otisco Lake. In this were two kinds of paint, and two long tubes of light-green clay, resembling the green gypseous shales, with flint arrow-heads. Two skeletons lay side by side, and the rare relics point to an early day.

W. M. BEAUCHAMP.

Baldwinsville, N.Y., April 18.